

22. (new) The process of Claim 21, wherein the hydrocarbyl compound is represented by formula (II):



wherein,

R is a halogen, an electron-withdrawing group or a hydrocarbylchalcogenyl group, a hydrocarbyl radical or the sulfur, selenium or tellurium counterparts thereof;

X is a halogen;

Y is a chalcogen;

r is 0, 1 or 2, with the proviso that when Y is oxygen, r is equal to 0; and

R' and R'', which may be identical or different, are each hydrogen, or an aryl or lower alkyl radical;

Ar is a compound having at least one double bond and in which the carbon atom from which the double bond depends is an sp^1 carbon or an sp^2 carbon.

23. (new) The process of Claim 22, wherein Ar is a lower alkyl radical having not more than 10 carbon atoms.

24. (new) The process of Claim 21, wherein the peroxide is aqueous hydrogen peroxide or a hydroperoxide.

25. (new) The process of Claim 24, wherein the hydroperoxide is an acyl hydroperoxide or an alkyl hydroperoxide.

26. (new) The process of Claim 21, wherein the halogen reactant is chlorine or fluorine.

27. (new) The process of Claim 21, wherein said chalcogen is sulfur.

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Ant 28. (new) The process of Claim 27, wherein said sulfur is in the form of a sulfone, a sulfoxide or a sulfenate.

29. (new) The process of Claim 28, comprising hydrolysis in an alkaline medium to form a sulfinic or sulfonic acid salt.

30. (new) The process of Claim 21, wherein the amount of the halogen reactant is in the range from about 0.5 to about 1.5 times the stoichiometric amount.

31. (new) The process of Claim 21, wherein the amount of the halogen reactant is in the range from about 0.9 to about 1.3 times the stoichiometric amount.

32. (new) The process of Claim 27, wherein the hydrocarbyl compound comprises a perfluorinated carbon atom vicinal to the sulfur atom.

33. (new) The process of Claim 32, wherein the hydrocarbyl compound is reacted with the halogen reactant to form a sulfinyl halide.

34. (new) The process of Claim 33, wherein the halogen reactant is chlorine.

35. (new) The process of Claim 21, wherein the halogenation reaction is carried out in a dilute non-polar, essentially anhydrous and chlorine-insensitive solvent.

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36. (new) The process of Claim 35, wherein the solvent is unable to dissolve more than 5% mass of water.

37 (new) The process of Claim 35, wherein the content of water in the solvent is at most 1/3 in mole of the hydrocarbyl compound.

38. (new) The process of Claim 35, wherein the content of water in the solvent is at most 1/5 in mole of the hydrocarbyl compound.

39. (new) The process of Claim 35, wherein the content of water in the solvent is at most 1/10 in mole of the hydrocarbyl compound.

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40. (new) The process of Claim 35, wherein the hydrogenation is carried out at a temperature at most equal to 100°C. --
